

REMARKS

Favorable reconsideration of this application in light of the following discussion is respectfully requested.

Claims 1-5 and 7-11 are currently active in this case. Claims 12-17 have been cancelled by a previous amendment. In the present amendment, Claim 6 is cancelled without prejudice or disclaimer, and Claims 1, 5 and 7-9 are amended without introducing any new matter.

In the March 19, 2008 Office Action, Claim 5 was objected to for a formal issue. Claims 1-11 were rejected under 35 U.S.C. § 102(b) as anticipated by Sato et al. (Japanese Patent Publication JP 2001-093524, hereinafter "Sato"). Alternatively, Claims 2-3, and 10 were rejected under 35 U.S.C. § 103(a) as unpatentable over Sato.

In response to the objection to Claim 5, this claim is amended to recite "2.2" instead of "2,2". Because this is a mere formal change, no new matter has been added.

In addition, independent Claim 1 is amended to recite all the features of dependent Claim 6. Consequently, dependent Claim 6 is cancelled without prejudice or disclaimer, and the claim dependency of Claims 7-9 are amended to now depend from independent Claim 1. No new matter has been added.

In response to the rejection of Claims 1-11 under 35 U.S.C. §§ 102(b) and 103(a), Applicants respectfully traverse the rejections, and request reconsideration thereof, as next discussed.

Briefly summarizing, Applicants' amended independent Claim 1 is directed to a nonaqueous electrolyte secondary battery. The battery includes a positive electrode, a negative electrode including an alloy having a CeNiSi₂ type crystal structure, and a nonaqueous electrolyte. In addition, the alloy has a composition represented by a formula $\text{LnM}_1\text{xM}_2\text{y}$, where Ln denotes at least one kind of element selected from the elements having

an atomic radius falling within a range of 1.6×10^{-10} m to 2.2×10^{-10} m, M1 is at least one element selected from the group consisting of Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, and Nb, M2 is at least one element selected from the group consisting of P, Si, Ge, Sn and Sb, and x and y satisfy the conditions of $0.5 \leq x \leq 1.5$ and $1.5 \leq y \leq 3.5$.

As described in Applicants' specification from page 34, line 16, to page 35, line 6 in non-limiting example, the alloy as described in Claim 1 can be prepared by an induction heating method, and during this heating method, a melt cooling rate needs to be controlled in a range of 10^1 to 10^4 K/s. More examples of the manufacturing process of the alloy are described in Examples 18-31, from page 54, line 22, to page 55, line 4 of Applicants' specification.

Moreover, as explained in Applicants' specification from p. 31, l. 21, to p. 34, l. 10, the alloy that has a CeNiSi₂ type crystal structure and has a composition represented by LnM_{1x}M_{2y}. This features allow to increase the reactivity of the alloy with lithium, and also can improve the discharge capacity of a nonaqueous electrolyte battery. Please note that the above discussion is for explanatory purposes only, and is not intended to limit the scope of the claims.

Turning now to the outstanding rejections, the pending Office Action asserts that Sato teaches the features of Applicants' dependent Claim 6 related to the chemical elements and atomic radiuses, these features now being incorporated in independent Claim 1, at paragraph [0008]. (Office Action, p. 2, ll. 14-16.) Applicants respectfully disagree with this position and traverses this position, as next discussed.

Sato explains in his paragraphs [0020], [0037], and [0039] that active materials are synthesized by a casting process in an arc melting furnace. However, in Sato there is no description of the cooling rate in a range of 10^1 to 10^4 K/s, as explained in Applicants' specification. Therefore, Applicants submit that the active materials described in Sato have a

different crystal structure from those that are encompassed by the features of Applicants' amended independent Claim 1.

The active materials that are described in Sato include an A phase, B phase, and a C phase, and each of the A, B, and C phase are binary alloy systems that ***do not*** have a CeNiSi₂ type crystal structure that belong to a ternary alloy system, as can be seen in Sato's paragraphs [0010]-[0019], and paragraphs [0027]-[0036], and in all of his Examples 1-65 shown in Tables 1-3. Even if some of the examples of the alloys have the same composition, they are still produced by different manufacturing methods, and the resulting crystal structures are different from each other as next explained.

For example, the composition of an active material shown in Sato's example 15 of Table 1 is represented by LaNi₂Sn and the active material includes an A phase consisting of LaSn₂ phase, and B phase consisting of Ni₃Sn₂ phase and Ni₃Sn phase. In addition, with respect to the manufacturing method of the active material shown in this example 15, Sato explains that elementary substances of various material elements were mixed in a given ratio and in form of a block, plate or particle, and cast in an arc melting furnace. The obtained casting was made into spherical particles using a gas atomizing method under Argon atmosphere. In this case a diameter of an injection nozzle was 1 mm ϕ , and an injection pressure was 100 kgf/cm². Then, active material particles which have an average particle diameter of 28 μ m were obtained by screening the obtained particles with a sieve having a 45 μ m mesh. (Sato, ¶ [0039].)

To compare Sato's alloy that is represented by a composition LaNi₂Sn with another alloy made of the same composition, we are submitting the reference Zhuang et al. for consideration by an Information Disclosure Statement. (Y. Zhuang, H. Deng, J. Liu, Q. Yao, Publication of the Journal of Alloys and Compounds 363, January 28, 2004, "The 673 K isothermal section of the La-Ni-Sn ternary system.", hereinafter "Zhuang".) Please note that

this reference was published January 28, 2004 and is not prior art against Applicants' Japanese priority applications, and the filing of this reference in an Information Disclosure Statement is also not an admission of prior art. 37 C.F.R. § 1.97(h)

In this publication, Zhuang describes an alloy of a phase region 30 that is shown in Table 3. (Zhuang, p. 225, Table 3.) Just like in Sato, this alloy has a composition represented by LaNi_2Sn , also shown in Zhuang's Fig. 1. However, unlike in Sato, this alloy consists of an LaNi_2Sn_2 phase, a LaNiSn phase, and a LaNi_5 phase. Therefore it is clear that the crystal structure of Zhuang's LaNi_2Sn composition is different from the one in Sato. Zhuang also describes his manufacturing process and explains that the alloy of the phase region 30 is annealed by performing heating processing at 673 K (400°C) for 240 hours. (Zhuang, p. 224, col. 1, ll. 15-19, "The alloys in the La-Sn binary system were homogenized at 903 K for 720 h at first and then they were cooled down to 673 K at a rate of 0.15 K/min, and finally kept at 673 K for 240h.") This method of manufacturing the alloy is clearly different from the one described in Sato.

In light of the above described comparison between Sato's and Zhuang's different manufacturing methods that lead to different crystal structures of an LaNi_2Sn alloy composition, it is clear that different manufacturing methods lead to different crystal structures, even if the alloy compositions are the same.

Moreover, Zhuang describes that $\text{La}_3\text{Ni}_2\text{Sn}_6$ having a CeNiSi_2 -type crystal structure is observed in regions of 7, 8, 15, 16, 17 and 18, as shown in Zhuang's Fig. 1. Zhuang's method of manufacturing the $\text{La}_3\text{Ni}_2\text{Sn}_6$ is the same as that for manufacturing the alloy of the phase region 30. Zhuang then describes that "the substitution of a small amount of Sn for Ni in LaNi_5 alloys can improve the property and hydrogen storage ability of LaNi_5 alloys." (Zhuang, p. 223, col. 1, ll. 8-11.) But Zhuang also does not mention that the alloys can be used in a nonaqueous electrolyte battery.

Accordingly, Applicants respectfully submit that the reference Sato fails to teach the crystal structure as recited in Applicants' Claim 1, and the crystal structure is also not inherent in light of the teachings of Sato. Applicants respectfully submit that the fact that a certain result or characteristic *may* occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. See M.P.E.P. § 2112-IV, see also In re Rijckaert, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993). Moreover, to establish inherency, the extrinsic evidence "must make clear that the missing descriptive matter is *necessarily present* in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, *may not be established by probabilities* or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." In re Robertson, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted, emphasis added). Applicants have submitted extrinsic evidence with the reference Zhuang that shows the contrary. Therefore, Applicants respectfully traverse, and request reconsideration of the rejections based on the reference Sato.

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal Allowance. A Notice of Allowance for Claims 1-5 and 7-11 is earnestly solicited.

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact Applicants' undersigned representative at the below listed telephone number.

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